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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
VU, DAVID	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/705,889	LIN ET AL.	
	Examiner	Art Unit	
	DAVID VU	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/173,596.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/13/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 2 is rejected under 35 U. S. C. 102(b) as being anticipated by Nagel et al. (US Pat. 5,864,153, herein after Nagel).

Nagel discloses in figs. 7A-7B a method for fabricating a capacitor comprising the steps of: forming a lower electrode 22 (col. 11, lines 34-36) of a metal over a substrate 10; forming a capacitor dielectric film 23 (col. 11, lines 36-39) of an oxide dielectric film on the lower electrode 22; and forming an upper electrode 24 of a metal on the capacitor dielectric film, conditions for forming the lower electrode 22 and the upper electrode 24 being controlled so that an oxygen concentration in the upper electrode 24 is higher than that in the lower electrode 22 (col. 11, line 65 through col. 12, line 7).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1 and 3-9 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Nagel et al. (US Pat. 5,864,153) in view of Won et al. (US Pat. 6,136,641, herein after Won).

Regarding claims 1, 3 and 4, Nagel discloses in figs. 7A-7B a method for fabricating a capacitor comprising the steps of: forming a lower electrode 22 (col. 11, lines 34-36) of a metal over a substrate 10; forming a capacitor dielectric film 23 (col. 11, lines 36-39) of an oxide dielectric film on the lower electrode 22; and forming an upper electrode layer 24A of a metal on the capacitor dielectric film, patterning the metal film 24A to form an upper electrode 24 of the metal film (col. 11, line 65 through col. 12, line 7) and performing a thermal processing in a hydrogen-content atmosphere after the step of forming the upper electrode 24 (col. 12, line 28-30).

Nagel discloses all claimed subject matter, but fails to disclose patterning the metal film 24A after the step of performing the thermal processing in a hydrogen-content atmosphere. However, Won teaches the thermal treatment in a hydrogen-content atmosphere could be performed before or after forming an upper electrode (col. 2, lines 58-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Nagel by using thermal processing in a hydrogen-content atmosphere as taught by Won, the motivation being to obtain the advantage/benefit of reducing the leakage current through the capacitor dielectric film by improving the interface state between the capacitor dielectric film and the lower electrode.

Regarding claim 7, Nagel discloses conditions for forming the lower electrode 22 and the upper electrode 24 being controlled so that an oxygen concentration in the upper electrode 24 is higher than that in the lower electrode 22 (col. 11, line 65 through col. 12, line 7).

Regarding claim 5, Nagel discloses in figs. 7A-7B a method for fabricating a capacitor comprising the steps of: forming a lower electrode 22 (col. 11, lines 34-36) of a metal over a substrate 10; forming a capacitor dielectric film 23 (col. 11, lines 36-39) of an oxide dielectric film on the lower electrode 22; and forming an upper electrode layer 24A of a metal on the capacitor dielectric film, patterning the metal film 24A to form an upper electrode 24 of the metal film (col. 11, line 65 through col. 12, line 7) and performing a thermal processing in a hydrogen-content atmosphere after the step of forming the upper electrode 24 (col. 12, line 28-30); forming an uppermost passivation film over the upper electrode 24 after the step of performing the thermal processing (col. 12, line 48-50).

Nagel discloses all claimed subject matter, but fails to disclose patterning the metal film 24A after the step of performing the thermal processing in a hydrogen-content atmosphere. However, Won teaches the thermal treatment in a hydrogen-content atmosphere could be performed before or after forming an upper electrode (col. 2, lines 58-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Nagel by using thermal processing in a hydrogen-content atmosphere as taught by Won, the motivation being to obtain the advantage/benefit of reducing the leakage current through the capacitor dielectric film by improving the interface state between the capacitor dielectric film and the lower electrode.

Regarding claim 6, Nagel discloses performing a thermal processing in a forming gas composed of a mixed gas of nitrogen/hydrogen (col. 12, lines 28-30).

Regarding claims 8 and 9, Nagel discloses conditions for forming the lower electrode 22 and the upper electrode 24 being controlled so that an oxygen concentration in the upper electrode 24 is higher than that in the lower electrode 22 (col. 11, line 65 through col. 12, line 7).

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (571) 272-1798. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can

be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Vu

June 10, 2004